BQUANT Dashboard

July 2021

Type Dashboard

Title International Yield Monitor

Version 1.0

Date 2021-07-04

Description Collection of statistics, figures and tables that allow the user
to quickly visualize information about a country's fixed income market.

Suggests bql, bqplot, ipywidgets, pandas, numpy

Author Diego Della Rocca de Camargos
Jadson Henrique Correa dos Santos
Keven Wender Mendes Vilela
Pedro Paulo Portela Teles

Yield Curve

Details

A yield curve is a line that plots yields (interest rates) of bonds having equal credit quality but differing maturity dates. The slope of the yield curve gives an idea of future interest rate changes and economic activity.

There are three main shapes of yield curve shapes: normal (upward sloping curve), inverted (downward sloping curve), and flat. (Investopedia)

Import this data in BQNT

As in the "BQL for Yield Curves" project inside "BQL for Fixed Income":

```python
import bql
import pandas as pd
from collections import OrderedDict

bq = bql.Service()

#define curve universe
curve = bq.univ.members('YCGT0022 Index',type='curve_tenors')

flds = OrderedDict()

#specify data fields to pull for each bond
flds['tenor'] = bq.data.id()['tenor']
flds['rate'] = bq.data.curve_rate(side='mid')

req = bql.Request(curve, flds)
res = bq.execute(req)

#create dataframe
yc = pd.DataFrame({r.name:r.df()[r.name] for r in res})
```

Listing 1: Import Yield Curve for United Kingdom

Forward Rate Agreement

Details

"Forward rate agreements (FRA) are over-the-counter contracts between parties that determine the rate of interest to be paid on an agreed-upon date in the future. In other words, an FRA is an agreement to exchange an interest rate commitment on a notional amount." (Investopedia)

$$FRA5Y5Y_{NominalRate} = \left(\left[\frac{(1+SPOT\ RATE_{10})^{10}}{(1+SPOT\ RATE_5)^5} \right]^{0.5} - 1 \right) * 100$$

Implied Inflation

Details

"Implied inflation expectations are market-based estimates of future price inflation over a given time period (MerkFunds)"

Natural Real Interest Rate

Details

"The natural rate is defined to be the real fed funds rate consistent with real GDP equaling its potential level (potential GDP) in the absence of transitory shocks to demand. Potential GDP, in turn, is defined to be the level of output consistent with stable price inflation, absent transitory shocks to supply. Thus, the natural rate of interest is the real fed funds rate consistent with stable inflation absent shocks to demand and supply." (Federal Reserve Bank of San Francisco)

$$NRIR = FRA5Y5Y_{NR} - FRA5Y5Y_{CDS} - IF_{10y}$$

where NRIR is the Nominal Rate Interest, $FRA5Y5Y_{NR}$ is the Forward Rate Agreement of Spot Nominal Rate, IF_{10y} is the Implied Inflation 10Y and $FRA5Y5Y_{CDS}$ is the Forward Rate Agreement of Credit Default Swap. The last term is calculated as follows:

$$FRA5Y5Y_{CDS} = \left(\left[\frac{(1+CDS_{10})^{10}}{(1+CDS_5)^5} \right]^{0.5} - 1 \right) * 100$$

1 Credit Default Swap

Details

"A CDS is the most highly utilized type of credit derivative. In its most basic terms, a CDS is similar to an insurance contract, providing the buyer with protection against specific risks. Most often, investors buy credit default swaps for protection against a default, but these flexible instruments can be used in many ways to customize exposure to the credit market." (PIMCO)

Inflation

Details

"Inflation is a sustained rise in the general level of prices—the price level. The inflation rate is the rate at which the price level increases.(Blanchard, O. Macroeconomics)"

Rating

Details

"A credit rating is a quantified assessment of the creditworthiness of a borrower in general terms or with respect to a particular debt or financial obligation. A credit rating can be assigned to any entity that seeks to borrow money—an individual, a corporation, a state or provincial authority, or a sovereign government." (Investopedia)

Yield Curve Slope

Details

"The slope of the yield curve provides an estimate of expected interest rate fluctuations in the future and the level of economic activity. (WallStreetMojo)"

$$10Y - 5Y = SPOT\ RATE_{10} - SPOT\ RATE_{5}$$